



# **Flood Plain Management & Hazard Mitigation Task Force Report**

To the Rebuild Iowa Advisory Commission

August 2008





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## Introduction

The Rebuild Iowa Floodplain Management and Hazard Mitigation Task Force respectfully submits its report to the Rebuild Iowa Advisory Commission (RIAC) for consideration as it receives all nine Task Force reports and weighs rebuilding priorities for the state. Floodplain management and hazard mitigation for all hazards are critical to the rebuilding efforts because of the potential for widespread and long-lasting impacts on the likelihood of damages resulting from future events. As the RIAC fulfills its obligations to advise the Rebuild Iowa Office in the recovery and reconstruction of Iowa, it is necessary to acknowledge that information and data dissemination about Iowa's watersheds, mitigation infrastructure, and overall floodplain management are important pieces of the overall design to provide communities and the state with opportunities to minimize damage in the future.

In order to make the best decisions about where people live, work, and recreate, the public must reach a higher level of understanding about floodplain management and hazard mitigation, challenges formerly left to scientists and natural resources professionals. Following the disasters of 2008, interest in floodplain management and hazard mitigation has taken center stage as many try to figure out exactly "how this happened." The Floodplain Management and Hazard Mitigation Task Force has examined the causes, issues of concern, and possible solutions in order to provide communities around the state with the tools necessary to make the best decisions possible in planning for the future. This report provides background information on the damages incurred in Iowa from the disasters and additional context for policy and rebuilding discussions. It also offers recommendations to the RIAC for steps that might be taken to address significant and important challenges faced by Iowa's communities.

In the aftermath of the severe weather and its widespread damages, Governor Chet Culver established the Rebuild Iowa Office to oversee the strategic recovery efforts in Iowa and to coordinate the efforts of state agencies as they address recovery issues. Executive Order Seven also established the Rebuild Iowa Advisory Commission to oversee the office and to provide 45-day and 120-day reports to the Governor, Lieutenant Governor, and General Assembly on the impacts, immediate recommendations, and long-term recovery vision for the state of Iowa. Also created in Executive Order Seven are nine Task Forces to provide information and recommendations to the RIAC. The Floodplain Management and Hazard Mitigation Task Force, one of the nine created, worked to ensure the RIAC is provided, at minimum, with the information required in this Executive Order. The Floodplain Management and Hazard Mitigation Task Force met in a day-long session on August 6 to identify, prioritize, and develop recommendations on ways Iowa can best create hazard mitigation tools and systems to minimize damages in future natural disasters. This report is the product of the discussions, public inputs, information presented, and the expertise and experience of the Task Force.

## **Rebuild Iowa Flood Plain Management and Hazard Mitigation Task Force**

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## Rebuild Iowa Office

- Deb Turnbull, Nashua-Plainfield Schools, Waverly
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- James Heavens, United Suppliers, Inc., Eldora
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- Brett Papendick, Wenzel & Harms, PC, Cedar Rapids
- Andrea Pracht, Baxter and Woodman, Crystal Lake, IL
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- Brian Schoon, Iowa Northland Regional Council of Governments, Waterloo
- Jeff Sherman, Floyd County, Charles City
- James Sines, Ackley, Kopecky and Kingery, Cedar Rapids
- Dan Varner, AFSCME, Ottumwa



## Rebuild Iowa Office

Task Force members were drawn from an all-volunteer pool of Iowans who expressed interest in serving the state. The response was overwhelming, with many more individuals volunteering than could be accommodated in the balance of a deliberative Task Force body. Rather than turn away volunteers who brought with them experience and expertise, each Task Force welcomed those volunteers to a Resource Group which participates in the meetings through offering presentations, specialized information, and additional inputs and ideas for rebuilding Iowa.

Rebuild Iowa Office staff supporting the work of the Flood Plain Management and Hazard Mitigation Task Force are Barbara Lynch, Emily Hajek, and Mary Jane Olney.

In support of the Rebuild Iowa effort, Task Force facilitation, staffing, and report development services were provided by State Public Policy Group (SPPG), Des Moines.





## Executive Summary

The Flood Plain Management and Hazard Mitigation Task Force emphasizes the long-term benefits of mitigation and management to the entire state in preventing or reducing damages from floods and other hazards faced in Iowa. Investments in efforts to manage watershed areas and to mitigate any damages from floods or other disaster events benefit individuals, families, communities, agriculture, business and industry, and certainly public entities and infrastructure. The Task Force encourages the Rebuild Iowa Advisory Commission to balance the immediate needs for rebuilding to include the beginning of the investments required to effectively mitigate future damage and maintain effective policy in Iowa's watersheds.

The significance of the damage seen in Iowa from the tornadoes, storms, and floods of 2008 include the loss of eighteen Iowans in disaster-related events. This alone should inspire investment in mitigation efforts for all hazards. Much of the damage resulting from the disasters can be tied to floodplain management and hazard mitigation, pointing the way toward enhanced efforts and new initiatives to safeguard lives, property, and communities' economic health.

Even so, it must be recognized that the weather events throughout last winter and spring added impetus to the rains and storms that ultimately resulted in record flooding. Some perspective must be maintained as planning progresses and significant investments in mitigation are considered to meet a specific level of safety and protection from future threats.

The Task Force identified a number of issues, and four were agreed-upon as those with the highest priority to be addressed by the Task Force through a set of recommendations.

- Critical needs of individuals and communities, including resident support, homes, businesses, and other infrastructure affected by the disasters need to be addressed. Topping this immediate need is finding adequate housing for those displaced from their homes and providing individual counseling or other support for people overwhelmed and trying to navigate their way through the many programs toward a 'normal' life.
- There is currently a lack of education, public information and awareness on floodplains in Iowa. Most people are not engaged on a practical level with the impact of floodplains in their daily lives, keeping them from making wise decisions about location of their homes, businesses, and community infrastructure. The gap in knowledge extends to public and private organizations and businesses, including nonprofits. The low number of National Flood Insurance Program (NFIP) or private flood insurance policies in place is but one indicator of the need for effective public outreach and education.
- There is currently a lack of program flexibility and continuity in floodplain management and hazard mitigation as well as other related programs. Task Force members emphasized the need to control the



water where it falls to best manage flooding. But funding streams for projects, mitigation, development, and recreation often create isolated initiatives not tied to others in the region or watershed. The Task Force considered the positive impacts which could be returned from cooperation and integration of programs and projects within a watershed.

- There is a need for greater hazard mitigation and floodplain management planning for the future. The process of planning engages organizations, governments, and other key stakeholders for the long term. In the cycle of emergency management, planning is never finished and builds upon the lessons learned from each disaster. There are ample opportunities now for communities and organizations within cities and regions to forge long-term commitments to mutually-beneficial planning.

To address these priority issues, the Flood Plain Management and Hazard Mitigation Task Force strongly urges that the Rebuild Iowa Advisory Commission and the state implement the following seven recommendations. Strategies for carrying out the recommendations are explained later in the report.

1. The state should immediately address critical needs of Iowans. As attention is turned to floodplain management and hazard mitigation, the Task Force strongly believes that displaced Iowans need to be provided adequate temporary or permanent housing.
2. The state should undertake awareness and education efforts on a continuous basis to engage Iowans, business and industry, organizations, and governments at all levels in steps and practices that control and reduce potential for damage from disasters. Such activities need to encompass developing individual knowledge and personal responsibility; training insurance agents about flood insurance and the meaning of commonly-used terms; and the risks of locating in any floodplain.
3. The state should assist in updating floodplain maps statewide as a priority initiative. Iowa's floodplain maps in some areas are more than 40 years old. Floodplain maps with accuracy up to one foot horizontally and eight inches vertically will greatly improve decision making by individuals and public and private organizations. LiDAR technology allows statewide floodplain imaging to be further supplemented with other data for projections and modeling for flood incidents and is considered to be the best option for Iowa's needs.
4. The state should support and participate in integrated and coordinated planning based on watershed areas. Keeping rain where it falls may reduce flooding at higher levels in a watershed. The capacity to positively impact the issue is through coordination and joint initiatives.
5. The state should take the lead in adopting land use practices and policies. Through providing leadership by changing its policies and practices of what types of state infrastructure are allowed to

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remain in a floodplain, and by working with local governments to utilize their experiences in planning discussions, others will follow. Statewide land use policy through planning should be considered.

6. The state should support community and regional processes for recovery and mitigation planning and projects. Plans are essential for effective floodplain management and hazard mitigation.
7. The state must study and implement a comprehensive and adequately-resourced levee inspection and flood plain management program.



## **Damages and Impact in Flood Plain Management and Hazard Mitigation**

While natural disasters cause intense damage to communities and people, they also provide an opportunity to revisit existing hazard mitigation efforts and floodplain management systems. Whereas these systems cannot guarantee full protection to people and communities, they can still provide a reasonable level of protection from natural disasters. The floods and other natural disasters of 2008 have had a severe impact on people, businesses and communities. Storms have posed challenges to housing, workforce, and public health. To minimize future damages, it is critical to look at the current systems and conduct assessments regarding success in protecting communities against devastation. These incidents also provide an opportunity to examine ways catastrophes can be effectively mitigated in the future. The Flood Plain and Hazard Mitigation Task Force met on August 6, 2008, and discussed issues of concerns that should be given priority in ongoing floodplain management and hazard mitigation deliberations. Through the floodplain management and hazard mitigation assessment, one can identify what requirements and where new approaches to planning are needed.

The damage and impact related to floodplain issues and mitigation needs is not quantified with dollar figures in this report. Those damages are, by and large, tallied by other Task Forces as they address specific issue areas. A total of all damages across the state outlined in the other eight Task Force Reports can be considered to have a link to the issues faced by the Flood Plain Management and Hazard Mitigation Task Force. However, damages and impacts on Iowans and their communities and livelihoods are described in this section as they connect to the problems and solutions offered by hazard mitigation initiatives and enhanced floodplain management.

Iowa's flooding cannot solely be attributed to rainfall. The winter of 2007- 2008 has been the 21<sup>st</sup> coldest and 8<sup>th</sup> wettest winter in Iowa's history with eastern Iowa facing record snowfall. Winter weather was followed by a wet spring season. The 2008 spring has been the 12<sup>th</sup> wettest and the 29<sup>th</sup> coldest spring which resulted in slow evaporation and drying of snow. During the flooding that followed in early summer, the 100-year and 500-year flood levels were exceeded in many parts of the state. Extreme weather was coupled with other natural calamities such as tornadoes that worsened the situation.

There were tragic consequences for Iowans in many communities as they lost property, economic strength, and community infrastructure. But for some families and communities, the ultimate loss struck. Eighteen lives were lost in Iowa as a result of the tornadoes, storms, and floods. While this report should not and does not place a dollar value on those lives, this loss must be a topmost driving force for the RIAC in its ongoing work to address the fundamental reasons for floodplain management and hazard mitigation.

According to the Iowa Department of Natural Resources (DNR), in Cedar Falls, the Cedar River crested from 100.8 feet to 103 feet. In Cedar Rapids, the Cedar River crested at 31.12 feet, which is 19 feet over

the flood stage. This resulted in significant flooding of parks and residences as well as the loss of a wastewater treatment facility in Cedar Rapids. In Des Moines, the Des Moines River crested from 30.74 feet to 32.3 feet which resulted in residential flooding. In Waterloo, the Cedar River crested from 23.3 feet to 31 feet putting 22 water wells in danger of being flooded. In Iowa City, the Iowa River crested from 28.8 feet to 30.5 feet. Due to this, The University of Iowa faced serious flooding on its campus and some neighborhoods experienced record flood levels. The rising water level also affected several industrial businesses and warehouses along Commercial Drive in Iowa City. In Mason City, the Winnebago River crested at 18.57 feet, higher than the 1993 flood level of 15.7 feet resulting in flooding of homes that forced residents to evacuate and the water treatment plant to close, also leading to the closing of all city restaurants. The city's 30,000 residents were asked not to drink tap water or flush toilets.

Tornadoes occurred in the towns of Parkersburg, Sinclair, New Hartford, Onawa, and the unincorporated town of Attica. The storms along with tornadoes brought rainfall ranging from 4-6 inches that caused flooding and flash flooding. In June, Mason City was impacted with heavy rain and flooding. As rain fell in Iowa, the Iowa/Federal Emergency Management Agency (FEMA) Joint Field Office (JFO) noted the following impacts:

- High water overtopped the levee in New Hartford.
- Saylorville and Coralville Dams emergency spillways were overtopped.
- Levee breached at Sixth and New York Streets in Des Moines.
- Levee breached in Birdland area of Des Moines.
- Levee breached in Oakville.

Other levees that were breached include Columbus Junction, Anamosa, and Wapello. In Columbus Junction, where the Iowa and Cedar Rivers meet, portions of the town went ten feet under water and almost half of the downtown businesses were affected. City officials closed down its water plant to prevent wells from being contaminated. In Anamosa, the wastewater treatment plant was flooded. City officials estimate that it will take \$3 million and at least three months to fix the treatment plant. In Cedar Rapids, the wastewater treatment plant was shut down. Officials estimate that 85 percent of plant processes were affected by the flood. Permanent repairs to the plant are estimated to cost approximately \$75 million. City officials predict that the wastewater treatment plant will not be back to pre-flood operation until the end of September 2008, but major progress continues to take place.

In Oakville, the United States Army Corps of Engineers (USAC) has authorization to make repairs to the current levee on an emergency priority basis, and expects these repairs to be completed by November 30, 2008. This repair does not raise or make any substantial changes in that levee, but does return it to its pre-flood condition. In the Flood Plain and Hazard Mitigation Task Force meeting, Roger Less of USAC



mentioned that in 1960, the Oakville levee was raised to a 100-year design levee, but studies have not been conducted to determine if it is still a 100-year levee under today's conditions. Many agree that further studies on the levees are needed since there have been changes in the hydrology of the state. USAC has identified at least 20 levees across the state that need repair work. USAC officials mention that those communities with damaged levees are at risk of future flooding. This creates an urgency to fix the levees as soon as possible. However, the levee repair projects will be funded on a priority basis via USAC's emergency money or by supplemental spending, dependent on Congressional approval.

Roger Less also informed the Task Force members that not all levees are under the same jurisdiction. Privately owned and locally-owned levees do not have any USAC involvement and are the responsibility of the individual owner or the local government owner. USAC does annual inspections of the levees that it builds, owns, and maintains. While USAC plans, designs, and builds levees, they are required to meet Iowa's permitting requirements. He also informed the Task Force that USAC is expected to do a cost-benefit analysis to determine whether levee repairs are justified and needed. If repairs are needed for non-federal levees, the federal government funds 80 percent of the repair, with a 20 percent local cost share required. For federal levees, USAC pays 100 percent of repair costs, but requires the local government to provide the materials and the right of way. He said that the flood study with the City of Cedar Rapids will exceed \$7 million in federal investment, which places it in a category requiring a specific authorization and funding. A Task Force member asked what criteria is looked at to determine the levee elevation. Less mentioned that levee elevations are based on a level of protection and slope of the rivers. Some levees provide 10 years, 50 years, or 100 years of protection. Higher-level protection varies from location to location. There are many levees that have not been certified by USAC.

It was also noted at the Task Force meeting that Iowa lacks a comprehensive and adequately-resourced levee inspection and floodplain management program. However, the floods of 1993 led to the introduction of the Upper Mississippi River Comprehensive Plan. This comprehensive plan for the Upper Mississippi and Illinois Rivers intends to develop a systemic, integrated strategy and implementation plan for flood damage reduction and related environmental restoration. The plan is being developed in coordination with the state of Illinois, Iowa, Minnesota, Missouri, Wisconsin, the Upper Mississippi River Basin Association, and other non-governmental organizations. The Comprehensive Plan will work towards evaluating alternatives for a systemic multipurpose flood damage reduction project consistent with environmental sustainability goals. The draft report for this project was completed in May 2006 which was followed by a series of four public meetings to present the Comprehensive Plan results. The Comprehensive Plan offered a number of Plans as listed:

- B-500-year Urban/Agriculture/Unprotected
- D - 500-year Urban & 100-year Agriculture.

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- E - 500-year Urban & 50-year Agricultural.
- G - 500-year Urban & Agricultural – allowing maximum of one foot impact to MR&T – MR&T impacts would be mitigated – requires storage area south of St. Louis.
- H - 500-year Urban, cost effective buyout of Agricultural areas.
- J - Floodplain buyout of the 500-year floodplain, except urban areas.
- M - Refined H&H analysis from Plans B & G, no storage area required south of St. Louis.

The Task Force recognized the importance of the state leading the way in comprehensive planning that does not just include the Upper Mississippi, but the entire state.

The 2008 disasters also brought attention to the issue of outdated floodplain maps in some areas. According to the Iowa Department of Natural Resources (DNR), only 50 of the Iowa's 99 counties have complete maps that meet federal standards. Outdated or incomplete maps are problematic because large parts of the state are unable to learn about future risks. Lack of updated or incomplete maps also limit many communities from eligibility for federal flood insurance, which is offered at lower rates than private flood insurance. A prerequisite to obtain federal flood insurance is to show an existing map of the community. Since many communities lack these maps, they are ineligible to be a part of the National Flood Insurance Program (NFIP). In Iowa, 502 communities are part of the National Flood Insurance Program. Out of these, 30 communities are in the Emergency Program and 472 are in the Regular Program. Of those that are in the Regular Program, 36 communities have no special flood hazard category and 201 fall under the minimally flood prone category. In Columbus Junction, only one structure carried flood insurance. There are also 133 communities in Iowa that are not in the National Flood Insurance Program but fall under hazard identified areas.

Congress established the National Flood Insurance Program (NFIP) to address both the need for flood insurance and the need to lessen the devastating consequences of flooding. The goals of the program are twofold: to protect communities from potential flood damage through floodplain management, and to provide people with flood insurance. For decades, the NFIP has been offering flood insurance to homeowners, renters and business owners, with one condition- that their communities adopt and enforce measures to help reduce the consequences of flooding. A complete list of Iowa communities that are participating and communities that are not participating can be found in the Supporting Data and Information section of the report.

It is estimated that it will cost \$150,000 per county to update maps or a total cost of \$15 million. Creating maps for all counties in Iowa will take a number of years to complete. However, the process can be expedited if enough funding is available. Another issue with Iowa maps is that there is no protocol that sets





time periods to update maps. The most recent map for the Cedar River was drawn in 1982. A new floodplain map which is being developed by FEMA shows that the levee on the Cedar River's west bank was not high enough to provide adequate protection to the city from a 100-year flood. The Flood Plain Management and Hazard Mitigation Task Force presenters strongly recommended LiDAR technology as a viable option to create reliable, accurate maps. LiDAR maps give +/- 2 feet of accuracy and the data provides a wide range of usage and is applicable to many agencies. There are standards that DNR needs to follow and they must work through the lengthy process of having preliminary review, public review and comment period. That process alone usually takes two years, though a number of measures can be taken that will reduce the time required.

Another issue that has surfaced due to flooding is the safety of existing dams in Iowa. Flooding in Cedar Rapids showed that dams had weak structures that were unable to withstand the water flow. The city of Independence is facing concerns about a dam built in the 1920s that could be damaged in the near future. Bridges that were designed years ago are not able to withstand the current disasters. Charles City lost their 102 year-old suspension bridge. The pillars of the bridge survived the flooding while the bridge collapsed into the river. Currently, there are about 3,300 dams in Iowa, of which 227 dams require regular inspections. Of these, 74 dams are required to be inspected at least once every two years and the remaining 153 dams have a five year inspection frequency. DNR is the agency that reviews, provides permits, and inspects dams. However, DNR lacks the resources to provide adequate reviews and safety inspections. Under the DNR's Flood Plain and Dam Safety Project, there are four full-time staff members that review and issue permits and one full-time dam inspector. DNR receives approximately 1,500 requests for permit applications each year, creating a backlog on receiving permits for proposed projects.

Recent floods have also been attributed to man-made designs that have altered the landscape. According to the DNR, between 2007 and 2008, farmers took 106,000 acres of Iowa land out of the Conservation Reserve Program and back into production. Practices such as these reduce the land available with perennial grasses that help absorb water. Iowa has also experienced massive wetland area loss due to the tiling of Iowa land. According to the Iowa State University Extension, one hundred years ago, four million acres of Iowa land were wetlands but that number has now been reduced to about 26,000 acres. In all, Iowa has lost more than 95 percent of its original wetland habitats.

Moreover, drainage districts have allowed alteration of rivers and streams, thus, removing bordering wetlands. Iowa's drainage system was put in place about 100 years ago and is outdated. The current drainage system does not allow soils to achieve their production potential. Wayne Petersen from Iowa Department of Agriculture and Land Stewardship (IDALS) mentioned at the Task Force meeting that it is important for Iowa to think about ways to infiltrate and store water. Modern landscapes are not designed to infiltrate water. Water on the land flows down to water bodies and takes everything with it, posing a threat to water quality. One of the simple ways to restore native landscape is to use compost/organic content.



Petersen also discussed infiltration based storm water management practices which include better site design soil quality restoration, native landscaping, bioswales and permeable transportation surfaces, and bio-retention. Petersen also introduced the concept of hydrological footprint describing how reengineering the tile drainage district system can address the issues of water flow as well.

Construction in floodplain areas is also problematic. In Iowa City, two-thirds of the damaged townhouses were in the 100-year floodplain. In Cedar Rapids, nearly 1,000 houses lie in the 100-year floodplain and many of them incurred severe damages. The Iowa Department of Natural Resources has authority to regulate construction on all floodplains and floodways in the state of Iowa. Iowa statute requires a permit for floodplain development, which includes buildings, bridges, levees, dams and a variety of other things like fill and excavations. In general, the state's floodplain regulations require that development in the floodplain be provided an adequate level of flood protection and not obstruct flood flows to the extent that would increase flood levels and damages on other floodplain properties. Houses are expected to have their first floor elevated at least one foot above the 100-year flood elevation and not be located in the floodway. Bridges must be elevated above potential flood levels and not increase upstream flood levels more than a specified level. Dams must be able to pass a particular flood level, the magnitude of which depends on the size of the dam and the potential damage to downstream properties should floodwaters overtop the dam causing it to fail. Each project category has specific standards it must meet to receive approval. In addition to the hydrologic review, a project's potential effects on the quality of water, fish, wildlife and recreation have to be evaluated. On average, the Department issues between 300 and 400 permits per year for floodplain development projects. The Department also receives over 200 complaints per year that require some degree of investigation and possible enforcement actions.

The preliminary impact assessment by the Conservation and Recreation Division in the Review of Impact from Statewide Disasters shows district by district assessment of structures such as dikes, levees, water control structures, parking lots, boat ramps, docks, culverts, signage, roads, and buildings are facing approximately \$4,000,000 in estimated impacts.

While damages to structures and systems may not show an immediate impact on the communities, these structures pose a threat to people and communities if they are not assessed and fixed quickly. The true damages to the people and communities caused by unstable systems and structures will only be visible in the coming months as Iowa faces more severe weather. Additionally, winter season, soon approaching, means that Iowa needs to ensure that existing systems provide adequate protection.

While it is almost impossible to create a foolproof system, Iowa needs to reexamine its existing systems and repair or upgrade them as needed. More attention is also needed in all-hazards and flood mitigation efforts, focusing on both structural and non-structural options.



## Issues in Floodplain Management and Hazard Mitigation

The flooding disasters of 2008 have affected individuals, businesses, organizations, and communities, especially those located in and near the floodplains of impacted areas. The disaster damages associated with floodplain issues encompass many cascading impacts that are independently addressed by many of the other Rebuild Iowa Task Forces. Numerous Flood Plain Management and Hazard Mitigation Task Force members recognized that this was a catastrophic chain of events, exacerbated by precipitation patterns and timing. The disasters of 2008 are unique and extreme, but, disasters such as this, with the same or greater magnitude, can occur again anywhere in the state of Iowa. As the state of Iowa works to rebuild and provide support to mitigate future disasters, particular attention should be paid to current and future statewide floodplain management. It should be noted that Iowa has taken the lead on hazard mitigation, with state and local hazard mitigation planning in place that makes the state eligible for five different hazard mitigation programs, with four conducted pre-disaster. These hazard mitigation planning measures have made receipt of public assistance dollars possible and diminished significant potential damage.

Considerations in floodplain management and hazard mitigation stretch from scientific and technological capabilities to effectively map and project areas of concern to finding ways to address critical issues of housing and other necessary infrastructure for individuals and communities. Frequently, discussions centering upon floodplain management and hazard mitigation focus on opportunities for assistance from the federal level. This is often appropriate, as federal programs play a major role in funding and carrying out management plans. However, it is important to remember that the ultimate decision-making authority rests in the hands of Iowa's communities. It is vital to note that although the amount of damage varies in different areas around the state, the damage was devastating, with 85 counties declared Presidential Disaster Areas for Public Assistance and 74 declared for Individual Assistance as of August 12, 2008.

According to the Governor's Institute on Community Design, although Iowa has experienced increased incidence of flooding in the past 15 years, the state still lacks the critical data on where floodwaters will flow. One essential consideration when examining flood concerns is that water flow does not follow city or county boundaries and needs to be examined with a regional approach based upon watershed areas. As the state works to rebuild Iowa safer, smarter, and stronger, floodplain management and hazard mitigation are the appropriate places to begin these efforts.

## Overview and Context

Currently, the Iowa Department of Natural Resources (DNR) is charged with the review and approval of floodplain development around the state either directly or through communities. The DNR is expected to implement floodplain management programs, which are often unique, along with maintenance and floodplain management in the state. When considering comprehensive floodplain management, it is necessary to take into account the science of the floodplain, the technology used to understand it, and

those entities who utilize the floodplain as a site for their home, business, or storage space and the risk that this utility presents.

The Floodplain Management and Hazard Mitigation Task Force discussed at length the importance of the availability of and subscription to flood insurance. Although tornadoes and other natural disasters are covered by traditional homeowners' insurance, flooding is not. Currently, participation in the National Flood Insurance Program is required only for those financing through a federally-insured lending institution that are located in the 100-year floodplain and their community or local government has land use jurisdiction which meets the criteria to make them eligible to participate in the program. The National Flood Insurance Program coverage is also available to all those living inside the community. Private flood insurance is available through some large companies in the form of "all hazard" policies in all areas, however, this coverage is often difficult to receive. Since flood insurance is often expensive, many home and business owners do not carry flood insurance policies. Currently, there is no requirement, unless required by a mortgage lender, for those living in the 500-year floodplain but outside of the 100-year floodplain, to carry flood insurance or access it through the National Flood Insurance Program.

There is discussion that alterations in the landscape through change in land use practices and growth management may change the face of the floodplain, but that has not been determined at this time. Those maps that have been developed by different entities have recognized different levels of probable flooding areas. Many have discussed mapping a maximum probable flood area, the value of which is disputed by some because mapping of an estimated maximum probable flood area could impact development planning and insurance rates. Although some floodplain maps do exist, many were mapped long ago using what is now considered "older technology." To have the tools available to most effectively map and produce better floodplain information for adequate planning and response, many are suggesting the use of new technologies, such as LiDAR (Light Detection and Ranging). Use of LiDAR technology would allow interaction with other technologies. For example, linking LiDAR with the Geographic Information System allows hydrologic models to be developed and to generate real time flood inundation maps for a considerable distance upstream or downstream. As these discussions progress, there are significant expenses and time issues to consider.

## Priority Issues

Many flood control efforts have cascading impacts, such as affecting water supply, wastewater treatment, fish and wildlife, business and commercial operations, housing, community and economic development, and recreational considerations. Issues at the forefront of the discussion in the area of floodplain management and hazard mitigation were varied and complicated in the face of limited comprehensive information and a large numbers of stakeholders filling a variety of roles in the system. With so many agencies and communities required to be part of designing and implementing effective management plans



for floodplains and hazard mitigation, it is extremely important that the state maintains a leadership role in addressing efforts and moving discussion and plans for the priority issues listed below:

- Critical needs of individuals and communities, including resident support, homes, businesses, and other infrastructure affected by the disasters need to be addressed.
- There is currently a need for education, public information and awareness on floodplains in Iowa.
- There is currently also a need for program flexibility and continuity in floodplain management and hazard mitigation as well as other related programs.
- There is a need for greater hazard mitigation and floodplain management planning for the future.

*Critical needs of individuals and communities, including resident support, homes, businesses, and other infrastructure affected by the disasters need to be addressed.*

Following the tornadoes, storms, and floods of 2008, the most immediate need is to address the issues of those faced by disruptions in and displacement from their homes, businesses, or from use of other structures. It is critical that these people find temporary and eventually permanent housing, and space to rebuild their lives. The Task Force felt it was a public responsibility to aid those left without a home regardless of their FEMA assistance eligibility, and that all people need to be in safe housing by the onset of cold weather. There is also a need for debris removal and cleanup efforts in these communities. After the immediate concern has been addressed, the overall issue of usage of floodplains for critical needs will need to be examined as will priorities for hazard mitigation efforts and priorities. Information about risks for floodplain development must be shared with those affected, as many post-disaster decisions made by families may be based more upon emotions than facts. Property located in floodplains is often more affordable and available than other nearby areas, and is typically accessed by high-need populations that are likely to face difficulty in finding comparable opportunities in other areas.

*There is currently a lack of education and public information and awareness on floodplains in Iowa.*

There is recognition that the public and stakeholders at different levels have very different perceptions regarding risk and definitions of floodplains in Iowa and the level of risk associated with them. DNR has made available a substantial amount of data, but much of the information has not been consumed by the public, even after many years of availability. Most notably, numerous citizens do not know the correct definition of the 100- and 500- year floodplain or what it means on a practical level, and the risks associated with settling within those boundaries. Without this knowledge, these individuals are not able to make the most informed decisions about building, buying or renting in the area, and purchasing flood insurance. Many have recognized that, often, this lack of understanding hinders appropriate decision-making and planning for individuals, cities, businesses and other public and private entities. Some cite the

need to remind people that there is an everyday risk to locating infrastructure in the floodplain, and that many do not take this risk seriously until a disaster strikes. Beyond basic information, a formalized need for additional data analysis on items such as current lifestyle and agricultural practices and their effects on the floodplain and subsequent plans was cited as a possible solution for future problems. It is also necessary to take into account the growth and development patterns of affected communities, which may assist in understanding their current situation and needs and influence long-term plans.

*There is currently a lack of program flexibility and continuity in floodplain management and hazard mitigation as well as other related programs.*

One Task Force member aptly noted that one cannot plan for every situation. Recognizing that the floodplains exist throughout the state, with housing, farmland, critical infrastructure and other items all located in those areas, program flexibility is a necessary component of a successful, comprehensive approach to statewide floodplain management. Floodplain management in Iowa includes bridges, roadways, dams, flood protection infrastructure, solid and liquid waste facilities, buildings, excavations, and a variety of other deposits and infrastructure. As floodplains develop, the federal government, state, and communities must work in tandem to meet their individual needs and priorities, which are often varied. Additionally, floodplain management is influenced heavily by a project and program-oriented approach. Programs generally have varying requirements depending on specifications that do not always fit well together to accomplish tasks. Finally, overall state-level regulations exist, but the Department of Natural Resources does not have the staff capacity to effectively put these regulations into place and enforce them. This difficulty in coordination may stand in the way of innovative, comprehensive decision-making.

*There is a need for greater hazard mitigation and floodplain management planning for the future.*

One of the most central messages in recovery is learning from the disaster and making decisions to manage future risks. Mitigation is not just about whether to re-build or build in certain higher-risk areas, but also to use updated information and technical assistance to plan and prepare for the next disaster. Since mitigation of floodplain issues requires a large-scale approach, complete and accurate information is key in making appropriate decisions. The principle of “infiltrate, don’t shed” to guide agricultural and urban design for sustainable land use is fundamental to the future of floodplain management and hazard mitigation. Mitigation for hazards in addition to flooding must also enter the discussion, even though they are less-often recognized by the public. Smaller communities frequently have concerns about being overshadowed by larger city’s priorities. As mitigation measures are planned and implemented to lessen the extent of damage to structures and quality of life of those affected, it will also be important to consider the environmental impacts of those decisions.



## Gaps

When current floodplain management and hazard mitigation procedures are studied relative to the disasters of 2008, gaps in programs and planning emerge. For the state to assist in developing solutions to meet the needs of those individuals and communities affected by location in or near floodplains, it is important to recognize these gaps, study them, and determine ways that the state can assist in alleviating the negative impacts that they create.

### 1. Differences between federal, state, and local programs.

Gaps in coverage, requirements, and focus between federal, state, and local programs present a significant challenge to the effective and straightforward management of floodplains. When programs are implemented simultaneously without cross-training and information sharing, it is easier for important items to get lost or overlooked. Also, it is more difficult for those entities working within floodplain management to effectively navigate the system and make the most appropriate choices.

### 2. Hazard mitigation funds may not provide comprehensive mitigation for the state as a whole. Depending upon the type of funding received and program eligibility criteria, some funds must only be used in affected areas.

Hazard mitigation has been noted as a sound investment with cascading positive impacts for communities in reducing future damage from occurring and avoiding loss of life and suffering. Hazard mitigation works best in local areas, where each effort can be designed independently to meet the specific needs for the neighborhood that it will be serving. As affected communities receive compensation to identify hazards, make plans to mitigate, and implement those projects to protect those jurisdictions from future damage, the benefits can be outstanding. A gap exists in that those areas unaffected by these disasters do not receive funding for mitigation and risk a future experience of the same results that their neighbors experienced. When certain individual and public assistance programs provide mitigation funding as part of their overall resource, this does not extend statewide. This gap presents a missed opportunity for other parts of the state to benefit from important and often tragic lessons learned, which will protect them in the future. Additionally, without the financial investment available, many local jurisdictions are often unable to access the information and best practices to make decisions to mitigate their risks. Additionally, hydrologic modeling of Iowa's rivers and watersheds is essentially nonexistent. This lack of modeling is not due to inadequate technology, but simply a matter of public understanding and political will.

### 3. There is no official coordinated plan to address statewide floodplain management concerns.

Many local communities have major questions in moving forward in recovery and rebuilding, as well as mitigating future concerns that have gone unanswered. Safety, economic feasibility, unidentified needs, and long-term issues present a challenge to move forward. Due to the program and project-oriented

approach to floodplain management in the state, there is no comprehensive system to provide this important information. “Federal red tape” and limited resources slow opportunities to make significant improvements. Without this coordinated approach, opportunities to strengthen management of Iowa’s floodplains are missed, leaving the state more vulnerable to future disasters.

4. There is a statewide gap in affordable property located outside of the floodplain.

Since affordable property is often located in the floodplain, it is not difficult to understand the high density usage of floodplain property and subsequent damage. It is often the most vulnerable Iowans: those with lower incomes or financial barriers that demand that they live in lower-valued areas. This gap is problematic when there is a disaster that puts those vulnerable Iowans who have chosen the more inexpensive property in a position to lose their homes. Also, due to the inexpensive nature of the property, it is often appealing for some business, public, or non-profit entities to place their headquarters or critical infrastructure in the floodplain due to its availability and affordability.





## Recommendations

Floodplain management and hazard mitigation are not household words. Attention given to these two important functions is typically limited to scientists, engineers, and specialists in natural resources, the environment, and emergency management. The Flood Plain Management and Hazard Mitigation Task Force aims to begin to change this situation and ensure that the benefits of and investments in floodplain management and hazard mitigation are clear to Iowans as recovery and rebuilding from the tornadoes, storms, and floods of 2008 begin. The Flood Plain Management and Hazard Mitigation Task Force developed the following recommendations as part of its examination of the current situation in Iowa, options for the future, and deliberations about the priorities to return the greatest benefits to Iowa.

These recommendations focus on the priority issues identified by the Task Force and in response to the Governor's Executive Order Seven. They are thoughtfully presented to the Rebuild Iowa Advisory Commission (RIAC) with recognition that they will require long-term commitments accompanying resources to address some of the most difficult and sensitive issues, albeit those issues returning the greatest results for the future.

There may be more pressing and immediate actions to occupy the early weeks and months of Iowa's recovery. In fact, the Task Force wholeheartedly agrees the topmost priority for the state is to ensure that all displaced residents have adequate temporary housing as quickly as possible. Yet, ultimately, few issues are more important than taking steps to ensure that the damage from all disasters is reduced through mitigation efforts and the severity of flood impacts is managed statewide over time. The recommendations offered for consideration by the Commission include a brief narrative explanation and suggested strategies to achieve the recommendation.

1. The state should immediately address critical needs of Iowans.
  - Addressing critical needs priority issue. Iowans affected by the disasters remain displaced from homes, workplaces, and community supports. There is a public responsibility to assist every Iowan to find adequate temporary or permanent housing as quickly as possible. With each passing day and week, negative impacts add up. Though hazard mitigation and floodplain management are important, it is more critical to take care of the immediate repair and support of Iowans' lives and livelihoods.
  - Strategies:
    - Facilitate identification and placement in temporary or transitional housing of all displaced Iowans and maintain personal support networks throughout the process.



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- Assess the need and identify appropriate assistance for community support structures to increase their capacity to serve and meet critical needs.
2. The state should undertake awareness and education efforts on an continuing basis to engage lowans, business and industry, organizations, and governments at all levels in steps and practices that control and reduce the potential for damage from disasters.
- Education and public information priority issue. The basic principles of floodplain management and hazard mitigation, if understood and applied, could result in lowans' remaining out of harm's way. A matter of information, understanding, and application of that knowledge, individuals, families, businesses, organizations, schools, and all levels of government stand to benefit over the short and longer term.
  - Strategies:
    - The state should take the lead in developing and promoting educational messages about flood insurance and its value, including training for private insurance agents and non-participating communities.
    - The state, regional groups, local governments, and interest groups should capitalize on the use of existing technical information to transform it into public educational messages, jargon-free, and appealing to the sense of individual, family, and community need. An example of this is to use more meaningful terms for 100-year and 500-year floodplain risks. An example: the 100-year floodplain has a 1% chance and a 500-year floodplain has a .002% chance of flooding in a given year.
    - The state should take the lead and engage communities in explaining and educating lowans about locating in or near floodplains so they can make informed decisions.
3. The state should assist updating floodplain maps statewide as a priority initiative.
- Lack of program flexibility and continuity priority issue. Floodplain maps in many areas of the state have not been updated in decades. An update is required in order to show whether there have been changes in the floodplains. Iowa residents should not have to make decisions on where to live or locate a business without complete information, sometimes with disastrous results as they have occurred this year. Some cities and areas of the state have invested in their own updating efforts using various methodologies while others need these maps to help meet the criteria as a participating community in the National Flood Insurance Program. LiDAR technology offers an opportunity to capture data and map it in a process that greatly improves accuracy. Because the mapping is a digital process, those data can also be used for modeling and projections to better



plan, prepare, and respond to future flood events. The relatively high investment in the technology and other components of the mapping initiative will return greater benefits to the state. There is also a greater need to study hydrologic modeling in the state of Iowa.

- Strategies:

- The state should expediently move forward in determining and securing funding, and in completing a statewide floodplain mapping initiative built upon the initial data gathering using LiDAR technology.
- The state should work with federal agencies for funding and support in completing the LiDAR flying to gather the data.
- The state should fund the remaining components to complete the floodplain mapping process, including the aerial photography and delineation of the floodplain boundaries for Iowa rivers and streams within five years.
- Use of the floodplain data should be promoted and made available to the public over the Internet.
- Hydrologic modeling using these new data should be developed and funded as a tool for floodplain management and for state and local decision making.
- The state should assess, update, and install the necessary gauges in the rivers to better track and respond to real-time river level changes.

4. The state should support and participate in integrated and coordinated planning based on watershed areas.

- Lack of program flexibility and continuity and greater need for planning priority issues. It is generally accepted that some flooding problems exist because of changes occurring upstream from the floods. The events of 2008 illustrated the impacts of not only the upstream land use and other practices that have reduced infiltration over the years, but also of an anomaly in the timing and amount of rain that fell this year in any given area. A clear lesson from these disasters is that planning, floodplain management, and hazard mitigation efforts would be most effective if they were undertaken by local and state entities focused on the watershed area. Additionally, the magnitude of this year's floods and the unexpected impacts in previously-considered safe locations illustrate program inflexibility in meeting the real needs of Iowans.
- Strategies:

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- The state should take the lead in and provide incentives and resources for communities within the watershed regions of Iowa to convene in a regional approach to floodplain planning and management.
- The state should convene federal, local, and state program leaders with responsibilities for all related programs from transportation infrastructure to recreational sites to identify and align program requirements and coordinate their impact on the floodplain, again most effectively implemented within a watershed area. Once convened, leaders should make recommendations and plan for development and implementation.

### 5. The state should take the lead in adopting land use practices and policies.

- Lack of education and public information and greater need for planning priority issues. Among the greatest tools for floodplain management and for hazard mitigation is to keep infrastructure, people, and hazardous materials out of harm's way. While recognizing it as a sensitive issue, statewide land use planning remains one of the most certain means to protect Iowans, the economy, property, and the state's environment from the impacts of floods. Because this is a difficult issue, it largely remains unaddressed even after similar needs statewide were identified following the devastation of the floods of 1993. The perceptions of Iowans are that floods are occurring more frequently at greater levels of severity. To protect our communities, ultimately the issue of land use must be addressed uniformly.
- Strategies:
  - The state should take the lead; provide technical assistance, and support communities and regions in developing local land use policies and practices to support floodplain management and hazard mitigation.
  - The state should develop and adopt a core or base level land use policy to protect Iowans from the impacts of flooding, based on current data and with involvement of local governments in the process.
  - The state should develop and promote urban practices that reduce stormwater issues.
  - The state should lead a statewide awareness campaign targeted toward individuals, business and industry, nonprofits, local governments, recreation and cultural industry, and others to educate them on how to remain or move out of harms' way as an investment in future protection from flooding.



- The state should provide funding and technical support to responsible entities and agencies to ensure existing floodplain management and hazard mitigation infrastructure located in Iowa are regularly inspected and maintained.
6. The state should support community and regional processes for recovery and mitigation planning and projects.
- Lack of program flexibility and continuity and greater need for planning priority issues. The Task Force felt many issues could be addressed in floodplain management and hazard mitigation with an approach to planning that focuses on the planning process and building mutually-beneficial relationships across jurisdictions and within an area (watershed or hazard area) that brings those entities together in a natural affinity. With scarcity of resources, lack of tangible motivation, and natural competition among communities, this is easier suggested than accomplished. Yet, the greatest positive impacts will result from strong planning processes.
  - Strategies:
    - Local and regional organizations should take a fresh look at how they can constructively promote community and regional planning processes and stakeholder engagement in light of their experiences with the tornadoes, storms, and floods of 2008.
    - The state, through appropriate agencies and partnerships of agencies, should provide leadership, models, technical assistance, and incentives for regional planning for recovery and hazard mitigation.
    - The state should work toward and advocate for eliminating conflicting or redundant program requirements and criteria in state, local and federal programs and increase the availability of needed waivers.
7. The state must study and implement a comprehensive and adequately-resourced levee inspection and flood plain management program.
- Need for greater hazard mitigation and floodplain management planning for the future priority issue. Iowa currently lacks this important comprehensive tool and necessary to best respond to the state's needs regarding overall floodplain management and levees. The state should work on raising the levees and creating better flood protection measures.
  - Strategies:
    - Determine and fund a comprehensive plan for the state of Iowa.

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- Assess, reach a consensus and fund, if appropriate, the Upper Mississippi Comprehensive Plan.



## Supporting Data and Information

- Flood Plain Mapping in Iowa
- Our Common Ground: Using LiDAR to Scan Iowa from Aircraft
- LiDAR Project Status Map (as of May 30, 2008)
- Linn County 100 and 500 year flood plain map
- City of Iowa City 100 and 500 year flood plain map
- Iowa Communities Participating in the National Flood Insurance Program
- Iowa Watershed Map
- FEMA Disaster Declaration Map (as of August 18, 2008)



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